

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 27 MAR 2006

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Applicant's or agent's file reference 52154WO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/IB2003/006107	International filing date (day/month/year) 22-12-2003	Priority date (day/month/year)
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Nokia Corporation et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 4 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ (sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
- This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 10-05-2005	Date of completion of this report 20-03-2006
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Peter Hedman /LR Telephone No. +46 8 782 25 00

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: **Cover sheet**

International patent classification (IPC)

H04B 7/005 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____ ,
which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
pages 1 - 18 _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____
- ☒ the claims:
pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 1 - 4 _____ received by this Authority on 08-11-2005
pages* _____ received by this Authority on _____
- ☒ the drawings:
pages 1 - 3 _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-25</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-25</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-25</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention relates to a method for providing an improved power control mechanism in a duplex time division cellular system. The claimed invention also refers to a computer program product, a transmission power controller, a cellular terminal, a base station and a radio access system adapted for performing execution of the suggested method.

Document cited in the International Search Report:

D1: US 2002031105 A1

The cited document represents the general state of the art. The invention defined in claims 1-25 is not disclosed by this document.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed power transmission controlling method. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-25 is novel and is considered to involve an inventive step. The invention is industrially applicable.

Anmelder: Nokia Corporation
Unser Zeichen: 52154 WO (KG/SE)
Appl. no.: PCT/IB2003/006107

Amended claims

- 5 1. Method for improved power transmission controlling in duplex time division cellular systems supporting multislot services, comprising
- obtaining a common target signal quality level; and
 - obtaining individual service quality levels each relating to one of several individual time slots; wherein said individual time slots are assigned to one composite transport channel
- 10 for a data stream resulting from combining of one or several transport channels; characterized by
- determining individual target signal quality offset levels each relating to one of said individual time slots on the basis of said individual service quality levels; and
 - determining individual target signal quality levels each relating to one of said individual
- 15 time slots on the basis of said common target signal quality levels and said individual target signal quality offset levels such that transmission power controlling is obtainable, which is adapted to specific interference conditions of each one of said individual time slots.
- 20 2. Method according to claim 1, comprising
- determining said individual target signal quality offset levels by mapping said individual service quality levels from a service quantity scale to a signal quantity scale.
- 25 3. Method according to claim 1 or claim 2, comprising
- mapping a difference between said individual service quality levels and a combined individual service quality level for determining said individual target signal quality offset levels.
- 30 4. Method according to claim 3, wherein said combined individual service quality level is a function of said individual service quality levels.
5. Method according to anyone of the preceding claims, wherein said individual service quality levels are bit error ratios.

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6. Method according to anyone of the preceding claims, wherein said common target signal quality level is adjusted in accordance with a common target service quality level and a common measured service quality level being determined from said data transmitted on said composite transport channel.
7. Method according to anyone of the preceding claims, wherein said common target signal quality level is obtainable from an outer loop power control mechanism.
- 10 8. Method according to anyone of the preceding claims, wherein said common target signal quality level is a common target signal to interference ratio.
- 15 9. Method according to anyone of the preceding claims, said transmission power controlling is capable for issuing transmission power control commands for each time slot, wherein said transmission power controlling is applicable for data communications in uplink and/or downlink direction.
10. Method according to anyone of the preceding claims, wherein said composite transport channel is a coded composite transport channel.
- 20 11. Method according to anyone of the preceding claims, wherein said time division duplex cellular system is a wideband code division multiple access - time division duplex (WCDMA-TDD) system and particularly a time division synchronous code division multiple access (TD-SCDMA) system.
- 25 12. Computer program product for executing a method for improved transmission power controlling in duplex time division cellular systems supporting multislot services, comprising program code sections for carrying out the steps of anyone of claims 1 to 11, when said program is run on a computer, a terminal, a network device, a mobile terminal or a mobile communication enabled terminal.
- 30 13. Computer program product for executing a method for improved transmission power controlling in duplex time division cellular systems supporting multislot services, comprising program code sections stored on a machine-readable medium for carrying out the steps of anyone of claims 1 to 11, when said program product is run on a computer, a terminal, a network device, a mobile terminal, or a mobile communication enabled terminal.
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14. Computer data signal embodied in a carrier wave and representing instructions, which when executed by a processor cause the steps of anyone of claims 1 to 11 to be carried out.
15. Transmission power controller for time division duplex cellular systems supporting multislot services, comprising at least
- means for obtaining a common target signal quality level; and
 - means for obtaining individual service quality levels each relating to one of several individual time slots; wherein said individual time slots are assigned to one composite transport channel for a data stream resulting from combining of one or several transport channels,
- characterized by
- means for determining individual target signal quality offset levels each relating to one of said individual time slots on the basis of said individual service quality levels; and
 - means for determining individual target signal quality levels each relating to one of said individual time slots on the basis of said common target signal quality level and said individual target signal quality offset levels such that said transmission power controller is able specifically adapt transmission power to individual interference conditions of each one of said individual time slots.
16. Transmission power controller according to claim 15, wherein said means for determining individual target signal quality offset levels comprises
- means for mapping said individual service quality levels from a service quantity scale to a signal quantity scale.
17. Transmission power controller according to claim 15 or claim 16, comprising
- means for mapping a difference between said individual service quality levels and a combined individual service quality level for determining said individual target signal quality offset levels.
18. Transmission power controller according to anyone of the claims 15 to 17, comprising
- means for adjusting said common target signal quality level in accordance with a common target service quality level and a common measured service quality level being determined from said data transmitted on said composite transport channel
19. Transmission power controller according to anyone of the claims 15 to 18, wherein said individual service quality levels are bit error ratios.

20. Transmission power controller according to anyone of the claims 15 to 19, wherein said common target signal quality level is a common target signal to interference ratio.
21. Transmission power controller according to anyone of the claims 15 to 20, comprising
- 5 - outer loop power control mechanism from which said common target signal quality level is obtainable.
22. Transmission power controller according to anyone of the claims 15 to 21, wherein said transmission power controller is provided for wideband code division multiple access - time
- 10 division duplex (WCDMA-TDD) systems and particularly for time division synchronous code division multiple access (TD-SCDMA) systems.
23. Cellular terminal capable to operate in a cellular time division duplex system supporting multislot services, comprising at least a transmission power controller for adjusting
- 15 transmission power control of downlink data transmissions, wherein said transmission power controller is a transmission power controller according to anyone of the claims 15 to 22.
24. Base station for cellular time division duplex system supporting multislot services, comprising at least a transmission power controller for adjusting transmission power control
- 20 of uplink data transmissions, wherein said transmission power controller is a transmission power controller according to anyone of the claims 15 to 22.
25. Radio access network system of a cellular time division duplex system supporting multislot services, wherein said radio access network system comprises at least one base station and at
- 25 least one radio network controller, wherein said radio access network system comprises additionally a transmission power controller for adjusting transmission power control of uplink data transmissions, wherein said transmission power controller is a transmission power controller according to anyone of the claims 15 to 22.

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